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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/525,814

02/28/2005

Naoki Suehiro

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38834

7590

09/04/2008

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EXAMINER

FLORES, LEON

ART UNIT

PAPER NUMBER

2611

MAIL DATE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/525,814	<b>Applicant(s)</b> SUEHIRO ET AL.	
	<b>Examiner</b> LEON FLORES	<b>Art Unit</b> 2611	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 May 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 2,3,5,7,10 and 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4,6,8 and 9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 May 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### **Response to Arguments**

1. Applicant's arguments with respect to claims (1, 4, 6, 8-9) have been considered but are moot in view of the new ground(s) of rejection.

### **Response to Remarks**

Applicant asserts that *"this rejection is respectfully traversed. That is, Applicants traverse the obviousness double patenting rejection on the grounds that claim 1 of the present application is patentably distinct from claim 1 of U.S. Application No. 10/525,737. Claim 1 of U.S. Application No. 10/525,737 fails to disclose transmitting said plurality of transmission data sequences SA,x, SB, r, ... onto the same transmission line at the same time, as called for in claim 1 of the present application, and instead is concerned with repeating each finite-length signal of said finite-length signals Sg, x, SB,y, ... to produce a pseudo periodic signal ..., SA,X, SA,X, SA,X ..., ..., SB,y, SB,y, SB,y, ..., ...; and cutting out a part from said pseudo periodic signal to produce a signal of a predetermined length longer than Nm for making said signal a transmission signal"*.

The examiner agrees.

Applicant finally asserts that *"the transmission data sequences of this invention have a data structure wherein a plurality of transmission data are arranged with 0 data of a predetermined length added between the plurality of the transmission data. It is obvious that a plurality of transmission data produced by Suehiro are not arranged with 0 data of a predetermined length added between the plurality of the transmission data. Because data A (1, 1, 1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, 1, -1) in Section 4 of Suehiro has*

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*no 0 data”.*

The examiner respectfully disagrees. One skilled in the art would know that the insertion of guard bands between symbols is notoriously well known in the art, and they are mainly used to prevent intersymbol interference. Furthermore, the reference that was presented by the examiner is applicant's owned work. However, taking the contrary, a new ground of rejection has been issued.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. **Claims (1, 4, 8-9) are rejected under 35 U.S.C. 103(a) as being unpatentable over Naoki Suehiro et al. (hereinafter Suehiro), “Very Efficient Wireless Frequency Usage by Coherent Addition of Multipath Signals Using ZCCZ Sequence Set”, Graduate School of Systems and Information Engineering, July 2002**

Re claim 1, Suehiro discloses a communication method comprising the steps of:  
using a plurality of data sequences

$$A=\{a_0, a_1, \dots, a_{N-1}\}, B=\{b_0, b_1, \dots, b_{N-1}\}, \dots$$

(See section 3, equation 1)

and a plurality of coefficient sequences

$$X=\{x_0, x_1, \dots, x_{N-1}\}, Y=\{y_0, y_1, \dots, y_{N-1}\}, \dots$$

(See section 3, equation 1)

But the reference of Suehiro fails to explicitly teach producing a plurality of  
transmission data sequences

$$S_{A,x}=\{x_0A, 0, x_1A, 0, x_2A, 0, \dots, x_{N-1}A, 0\}$$
$$S_{B,y}=\{y_0B, 0, y_1B, 0, y_2B, 0, \dots, y_{N-1}B, 0\}$$

(0 indicates a null time of a unit length where no signal is generated)

and transmitting said plurality of transmission data sequences

$$S_{A,x}, S_{B,y}, \dots$$

onto the same transmission line at the same time. (See sections 1-4)

However, the reference of Suehiro does suggest producing a plurality of  
transmission data sequences

$$S_{A,x}=\{x_0A, 0, x_1A, 0, x_2A, 0, \dots, x_{N-1}A, 0\}$$
$$S_{B,y}=\{y_0B, 0, y_1B, 0, y_2B, 0, \dots, y_{N-1}B, 0\}$$

(0 indicates a null time of a unit length where no signal is generated)

(See sections 2 & 3. Furthermore, one skilled in the art would know that the insertion of  
guard bands between symbols is notoriously well known in the art, and they are mainly

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used to prevent intersymbol interference.)

and transmitting said plurality of transmission data sequences

Suehiro

onto the same transmission line at the same time. (See sections 1-4)

Therefore, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Suehiro, in the manner as claimed, for the benefit of mitigating the effects of intersymbol interference.

Re claim 4, the reference of Suehiro further discloses that wherein, in an arbitrary combination of said plurality of transmission data sequences, a finite number of transmission data sequences in the transmission data sequences have a range in which a non-periodic cross-correlation function is 0. (See section 4.1, when we input transmission signal B into the matched filter for A.)

Re claim 8, the reference of Suehiro further discloses that wherein at least one transmission data sequence selected from said transmission data sequences is used as a pilot signal for measuring multi-path characteristics, and said pilot signal included in the transmission data sequences received via a transmission line has the multi-path characteristics of the transmission line. (See section 1)

Re claim 9, the reference of Suehiro further discloses that wherein a plurality of transmission data sequences are produced using different coefficient sequences and at

least one transmission data sequence selected from said transmission data sequences is used as a pilot signal with other transmission data sequences used as transmission signals, further comprising the steps of: finding multi-path characteristics from the reception signal of the pilot signal included in the transmission data sequences received via a transmission line; and producing the transmission data sequences obtained by removing the multi-path characteristics from the reception signal using the multi-path characteristics which are found. (See sections 1-4)

1. **Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Naoki Suehiro et al. (hereinafter Suehiro), “Very Efficient Wireless Frequency Usage by Coherent Addition of Multipath Signals Using ZCCZ Sequence Set”, Graduate School of Systems and Information Engineering, July 2002, as applied to claim 1 above, and further in view of Kelsuke Higuma et al. (hereinafter Higuma), “Simulation of Very Efficient Wireless Frequency Usage System using Multipath Equation on Spread Time Signals”, Graduate School of Systems and Information Engineering, June 2001.**

Re claim 6, the reference of Suehiro fails to explicitly teach that wherein said coefficient sequences are each formed by a unitary matrix.

However, Higuma does. (See section 7) Higuma discloses that the variation of complete complementary code depends on the variations of the Hadamard matrices or unitary matrices, which are used for the making of the complete complementary code.

Therefore, taking the combined teachings of Suehiro and Higuma as a whole. It would have been obvious to one of ordinary skills in the art to have incorporated this

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feature into the system of Suehiro, in the manner as claimed and as taught by Higuma, for the benefit of assigning different complete complementary codes for each cell. (See section 7)

### ***Contact***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEON FLORES whose telephone number is (571)270-1201. The examiner can normally be reached on Mon-Fri 7-5pm Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. F./

Examiner, Art Unit 2611

August 29, 2008



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